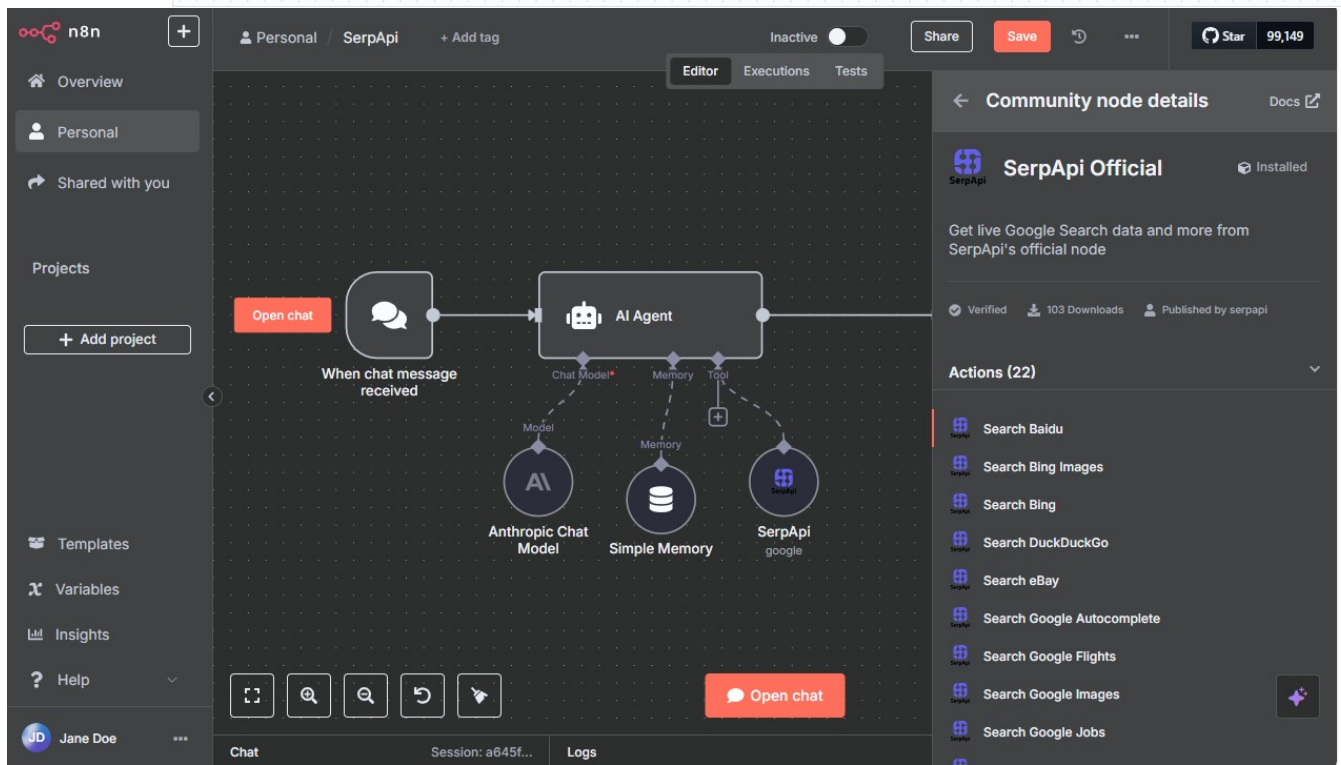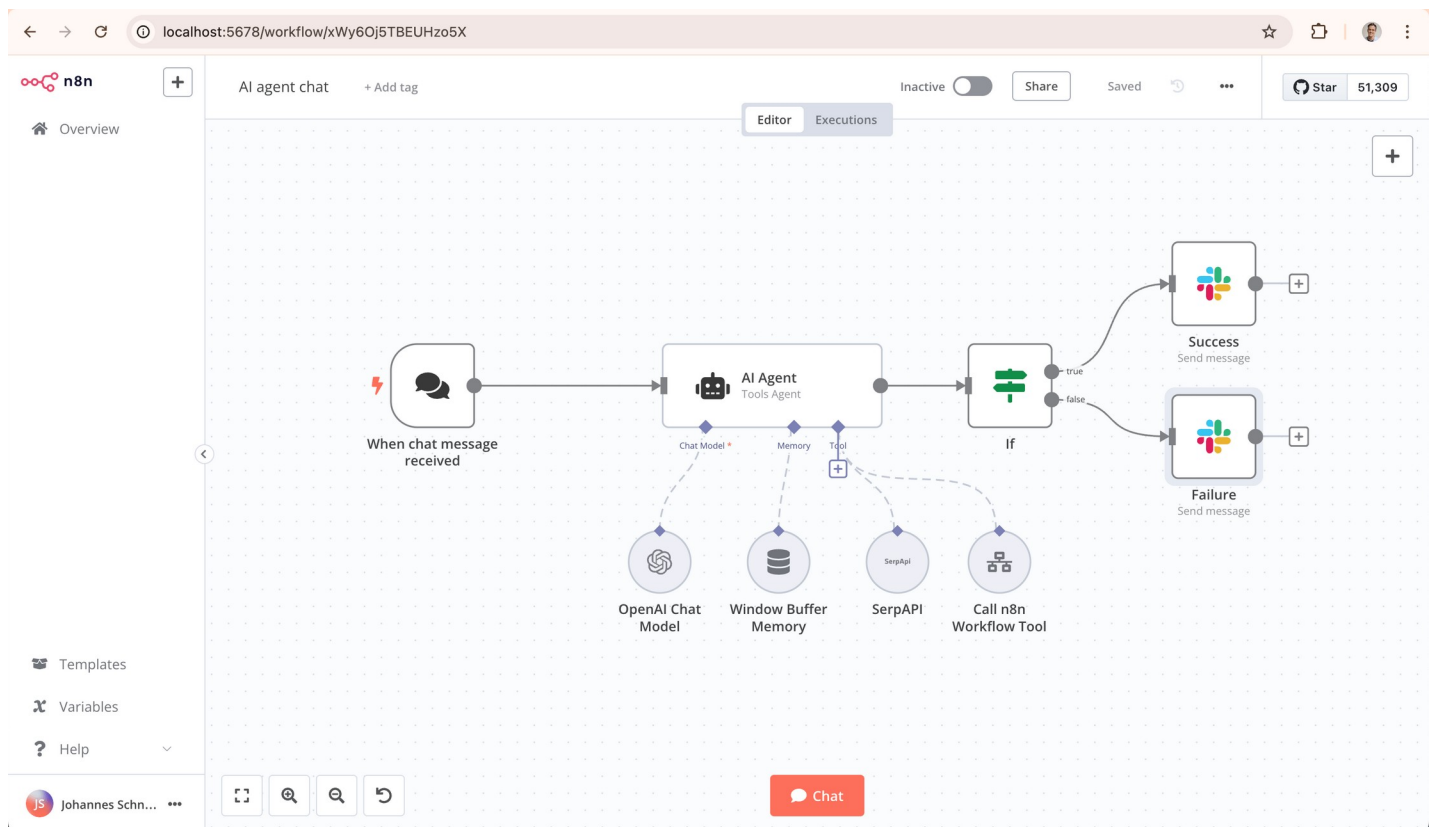# -------------N8N--
Introduction :

-- what is exactly is n8n
--why we're using n8n
-- And how it works behind the scenes

⏱️ 1. What Exactly Is n8n?

n8n (pronounced *"n-eight-n"*, short for "nodemation") is an **open-source workflow automation tool**.
It lets you **connect APIs, apps, and services** visually to create **automated workflows** — without having to write full backend scripts manually.

A developer-friendly version of Zapier or Make (Integromat).

- But unlike those, it's **self-hostable** and **programmable**.

👉 Examples of what you can automate:

- Sending a Slack message when a new GitHub issue is opened.

- Syncing leads from a form to your CRM.

- Running cron-based tasks like checking a website and sending alerts.

- Orchestrating multiple microservices without building custom backend glue code.

🧰 2. Why We're Using n8n

Developers, startups, and agencies use n8n mainly because of these **benefits**:

🔹 Feature	🧠 Why It Matters
Low-code workflow builder	Build complex automation visually (drag & drop), faster than writing everything in code.
Open-source & self-hosted	No vendor lock-in. Full control of data and infrastructure.
Powerful integrations	300+ ready-made nodes (GitHub, Slack, MySQL, REST API, Notion, etc.) + custom nodes.
Supports custom logic	You can write JavaScript directly inside workflows.
Event or schedule triggered	Can run on cron, webhooks, or external triggers.
Scalable	Can act as your backend workflow engine — integrate multiple services with conditional branching.

👉 Typical use cases:

- Marketing automations

- API orchestration

- Internal tool backend

- Data pipelines

- AI agent workflows

⚙️ 3. How n8n Works Behind the Scenes

Here's what happens technically when you use n8n:

🧩 a. Workflow Engine

- Every **workflow** in n8n is basically a **graph of connected nodes**.

- Each **node** is a task: calling an API, processing data, running code, etc.

- n8n uses a Node.js runtime under the hood.

- When a trigger node (like a webhook or cron) fires, it **executes the graph step by step**, passing data between nodes.

🕸️ b. Node Execution Flow

1. A **trigger** node starts the workflow (e.g., "When form is submitted" or "Every 5 minutes").

2. The workflow engine queues and runs the next connected node.

3. Each node:

   - Receives input data (JSON)

   - Executes its task (e.g., fetch from an API)

   - Passes output to the next node(s)

4. You can add **conditions**, **loops**, or **parallel paths** (split & merge data).

🧠 c. State & Data Handling

- n8n represents all workflow data in **JSON format**, so it's easy to transform or inject into requests.

- You can access previous node outputs with expressions like:
  `{{ $json.fieldName }}`

- n8n supports context variables, execution logs, and retries if something fails.

🏗️ d. Hosting & Runtime

- You can run n8n on:

   - Docker (most common for production)

   - Your own VPS/server

- Cloud (n8n.cloud)
- It runs a **Node.js server** with a web UI for building workflows.
- You can expose webhooks for real-time triggers or run scheduled jobs in the background.

🧰 e. Extensibility
- If no existing node suits your need, you can:
  - Write **custom code nodes** (JavaScript/TypeScript).
  - Create your own **custom node packages**.
  - Call any API with the **HTTP Request node**.
- It integrates smoothly with databases, APIs, queues, and AI models.

🚀 Example Behind-the-Scenes Flow

Let's say we make a workflow:

Trigger: New form submission on a website
⬇️
Node 1: HTTP Request to fetch extra data
⬇️
Node 2: Code node to clean/transform data
⬇️
Node 3: Insert into PostgreSQL
⬇️
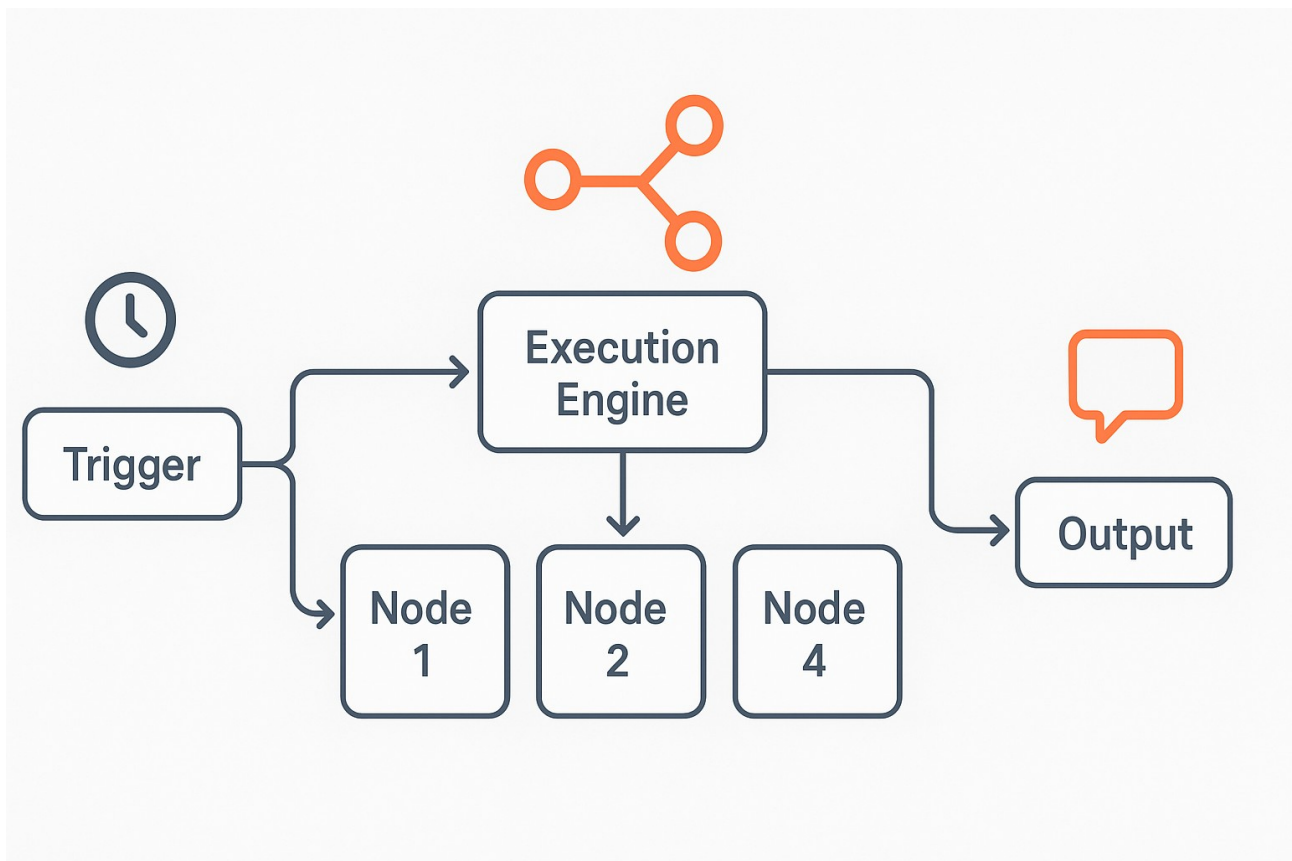**Node 4:** Send a Slack message to the sales team

👉 n8n executes this like a **mini pipeline**, no backend server needed from scratch.

✅ In short:
- **n8n = Open-source workflow automation tool**
- It **automates repetitive tasks**, connects APIs, and runs scheduled or event-based jobs.
- Under the hood, it's a **Node.js engine** executing a graph of nodes in order.

How N8N Works-------------

🚀 n8n Complete Guide

Workflow Automation Made Simple

"Connect anything to everything"

📌 What is n8n?

n8n (pronounced "n-eight-n") is a powerful workflow automation tool that connects different apps and services together to automate repetitive tasks without writing code.

Why use n8n? Save time by automating manual tasks, reduce errors, and connect your favorite tools seamlessly.

⚡ **Save Time**	🔗 **Connect Apps**	🎯 **No Code Needed**	💰 **Cost Effective**
Automate repetitive tasks and focus on what matters	Integrate 400+ apps and services easily	Visual workflow builder - drag and drop	Open-source and self-hostable

<table>
<tr>
<td>⚡ **Save Time**
Automate repetitive tasks and focus on what matters</td>
<td>🔗 **Connect Apps**
Integrate 400+ apps and services easily</td>
<td>🎯 **No Code Needed**
Visual workflow builder - drag and drop</td>
<td>💰 **Cost Effective**
Open-source and self-hostable</td>
</tr>
</table>

🧱 Think of n8n Like LEGO Blocks

Each block = one small task. Stack them together to build powerful automations!

🟥 → 🟥 → 🟥 = 🏰

🔧 Core Components of n8n

1 Node

What it is: The building block of n8n. Each node performs ONE specific task.

Think of it as: A single instruction or action in your workflow.

- 📧 Send Email
- 💬 Post to Slack
- 🪝 Receive Webhook
- 📊 Update Sheet

2 Trigger Node

What it is: The starting point that begins your workflow when something happens.

Starts when:

- 📧 New email arrives
- 📝 Form submitted
- ⏰ Scheduled time
- 🔔 Webhook received

3 Action Node

What it is: Performs an action AFTER the trigger fires. This is where the work gets done.

Common actions:

- 💬 Send Slack message
- 📊 Save to Google Sheets
- 📧 Send email via Gmail
- 📞 Create task in Asana

4 Flow/Workflow

What it is: The complete chain that connects trigger + actions together.

Formula: Trigger + Action(s) = Complete Workflow

This is your automation running from start to finish!

5 Variables

What it is: Temporary storage for data as it moves through your workflow.

Use for: Storing email content, form responses, API data, calculated values.

Data passes from node to node, getting processed along the way.

📊 How a Workflow Works

🎯 **TRIGGER**
New Email → ⚡ **ACTION 1**
Send to Slack → ⚡ **ACTION 2**
Save to Sheets = ✅ **COMPLETE WORKFLOW**

💡 Real-World Example

Scenario: Automatically save customer feedback to a spreadsheet

🎯 **TRIGGER:** Customer submits a feedback form on your website
⚡ **ACTION 1:** Send notification to Slack channel "customer-feedback"
⚡ **ACTION 2:** Add form data to Google Sheets with timestamp
⚡ **ACTION 3:** Send thank you email to customer via Gmail

✅ **RESULT:** Instant, automated response - no manual work needed!